# BIOCONVERSION OF VEGETABLE AND FRUIT WASTE AND ITS EFFECT ON GROWTH AND YIELD PARAMETERS OF BLACK GRAM AND LABLAB

**SYNOPSIS**

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**JULY 2022**

## INTRODUCTION

Organic agriculture is an alternative system of farming that provides the consumer with different options for achieving sustainable agriculture (Eyhorn *et al.,* 2019). Organic agriculture can also be described as the combined approach of innovation, conventional knowledge, and science to benefit the environment. Sustainable agriculture improves the production of food with minimal impact on the environment. Degradation of organic matters to produce eco-friendly compost is termed as organic farming.

Organic farming is described as an agricultural system of cultivation without the use of chemical fertilizers and pesticides. The food grown organically are increasing day by day due to the nutritional and health benefit provided by the foods (Das *et al*., 2020). India is the second largest producer of the fruits (81.285 million tonnes) and vegetables (162.19 million tonnes) in the world. Annually, around 30-40% of the total production is going in vain which costs around Rs.13,300 crores (Melikoglu *et al*., 2013).

India produces about 3000 million tonnes of organic waste annually which can be degraded to produce eco-friendly manure for a sustainable environment and about 72 % of the fruit and vegetable production is wasted due to the lack of proper retailing and storage facilities (Achsah and Prabha, 2013). Vegetable waste poses disposal and environmental problems, due to its high biodegradability. It represents a loss of valuable biomass and nutrients as well as an economic loss. For these reasons, great attention has been focused on the development of policies and methods for its management (Laufenberg *et al*., 2003).

Organic fertilizers and microbial biomass are the main resources used for increasing soil fertility. The recycling of crop residues and other organic matter is essential for supplying plant nutrients. A proper technique is required to give nutrients to plants through different organic resources and their application for maintaining soil productivity. Solid waste (SW) may be defined as unwanted materials in the wrong place, generated as a result of various human activities such as domestic, workplace, industries and normally discarded as useless or unwanted material (Ramachandra and Bachamanda, 2006).

Composting is a safe method for the disposal and recycling of organic waste by its conversion to organic fertilizer. Research is needed towards the acceleration of composting process, the better quality of compost, ascertaining the use of additives and finding cost-effective as well as efficient compost (Kumar, 2011; Lim *et al*., 2016). Organic manure can be used to improve soil fertility, major nutrients, microbial biomass and it is also another method of crop production for a safe environment and public health (Suresh *et al*., 2004).

Vermicomposting is a low-cost technological process of composting where earthworm species were introduced into the compost to generate a better end product. Application of vermicompost in the soil promotes the growth of the plant and helps in protecting the crops from pest and disease Vermicompost also increases microbial population in the soil and improves soil fertility which improves agronomic and horticulture crop yield (Sinha *et al.*, 2010). Chemical fertilizer may apply to increase the yield of the crop for a short duration but it will also affect the soil fertility, soil degradation and deteriorate the environment. The nutrient content of the vermicompost is much higher. Earthworms are responsible for breaking down complex substances in organic waste into simple water-soluble substances (Datar *et al.,* 1997). Vermicomposting is in the same line with the principle of a healthy environment because it has the value of resource conservation and sustainable practices, as a process for handling organic residue which is an alternative approach in waste management, which is not dumped or eradicated but recycled (Aalok *et al.*, 2008). Vermicompost improves soil structure, soil moisture holding capacity, vegetative growth and enhances crop yield.

The present study was conducted on two leguminous plants i. e. Black gram [*Vigna mungo* (L.) Hepper] Var. Co. 6 and Lablab [*Lablab purpureus* (L.) Sweet] Var. Co. (Gb) 14. Black gram is a bean, also known as urad dal. It is an annual herb, erect and hairy which grows mainly in South Asian countries like India, Pakistan, Bangladesh, Nepal, Thailand and Korea (Vanaja *et al.*, 2006). Black gram is a short duration legume highly rich in protein and play an important part in sustaining soil fertility by fixing atmospheric nitrogen (Baroowa and Gogoi, 2014). It is a healthy pulse that is rich in vitamins, minerals and storehouse of many nutrients. Lablab is a bushy or climbing herbaceous, annual plant commonly known as hyacinth bean or Lablab and belongs to the family Fabaceae. Lablab is an ancient crop in India and the third most imported vegetable in the central and western part of Bangladesh after eggplant and toro. It produces a twinning stem that can be 6-9 meters long and best known for its edible seed. Lablab is a multipurpose crop and its parts can be consumed as food i.e. seeds, immature grains, green pods, leaves, biscuits (Davari *et al.*, 2018; Rana *et al*., 2021), animal feed to improve soil fertility (Gebreyowhens, 2017) and in the form of green manure (Okumu *et al.*, 2018).

**OBJECTIVES:**

The objectives of the study include the following:

- To manage the vegetable and fruit wastes and convert them into eco-friendly compost for better growth and crop quality.

- To prepare compost using microbes such as *Pleurotus eous (APK1)* and *Trichoderma asperelloides* and earthworm species *Eudrilus eugeniae*
- To carry out Summer (April-June) and Winter (Dec.-Feb.) composting
- To count the microbial population of the compost on the $30^{th}$, $60^{th}$ and $90^{th}$ days.
- To study the Physico-chemical composition of raw and composted Vegetable and Fruit wastes.
- To study the effect of compost on the growth and yield of a Black gram (*Vigna mungo* L.) Var. Co. 6 and Lablab [*Lablab purpureus* (L.) Sweet], Var. Co. (Gb) 14
- To analyze the leghaemoglobin content in the nodules of Black gram and Lablab.
- To estimate the protein, carbohydrate and chlorophyll content in leaves of selected plants
- To estimate the protein, carbohydrate and crude protein in seeds of selected plants
- To study the antibacterial and antioxidant properties of the selected plants grown under the best treatment and control.
- To analyze the pre and post-harvested soil.

**METHODOLOGY AND WORKPLAN**

The present study consists of the biocomposting of vegetable and fruit wastes to produce compost or vermicompost using microbes such as *Pleurotus eous (APK1)* and *Trichoderma asperelloides*.

The workplan for the study consist of 4 phases

**PHASE I**

1. Collection of waste
2. Composting of vegetable and fruit wastes
3. Counting of microbial flora of the vermicompost

   The microbial population was counted on the $30^{th}$, $60^{th}$ and $90^{th}$ days
4. Physico-chemical properties of raw and composted vegetable and fruit wastes

   Physical parameters

   pH and electrical conductivity of the composted materials were estimated by using a glass electrode and an electrical conductivity bridge.

   Chemical parameters

   1. Lignin (%)
   2. Cellulose (%)
   3. Organic carbon (%)

4. Total Nitrogen (%)
5. Total Phosphorus (%)
6. Total Potassium (%)
7. Calcium and magnesium (%)

5. FT-IR analysis for raw and composted vegetable and fruit wastes.

**PHASE II**

1. Pot culture experiment

   Collection of seeds

2. Biometric characters

   Vegetative parameters such as Root length (cm), Shoot length (cm), Number of leaves, fresh weight and dry weight (g) were evaluated on 15, 30 and 55 DAS. The number of nodules on 25 and 50 DAS and the Number of flowers on 55 DAS were analyzed.

3. Yield parameters

   Yield characters such as Number of pods per plant, Length of pods (cm), Weight of pods (g), Number of seeds per pod, Weight of seeds per pod (g), Fresh weight (Pod) (g) and Dry weight (Pod) (g) were analyzed on 75 DAS.

**PHASE III**

1. Biochemical analysis
   a) Estimation of protein content by Lowry's Method
   b) Estimation of carbohydrate content
   c) Estimation of chlorophyll content
   d) Estimation of crude protein by Kjeldahl Method
2. Leghaemoglobin content

   Estimation of leghaemoglobin content

3. Pre and post-harvest soil Analysis

- pH and EC
- Available nitrogen
- Available phosphorus
- Available potassium

**PHASE IV**

The selected plant seeds were shade dried, powdered and extracted using soxhlet apparatus by using different solvents (aqueous and methanol) and stored for further studies.

1. Antioxidant Activity

- ❖ Hydrogen peroxide scavenging activity
- ❖ Reducing Power assay
- ❖ Nitric oxide radical scavenging activity
- ❖ DPPH radical scavenging activity

2. Antimicrobial Activity

- ❖ Well diffusion method

**RESULTS:**

**PHASE I**

**1. Collection of waste:**

The fruits waste is collected from in and around Saibaba Colony, Coimbatore, Tamil Nadu. Large quantities of fruits waste is also collected from outside and inside the campus fruit stall of Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore. The vegetable waste is collected from Saibaba Kovil vegetable market, Coimbatore, Tamil Nadu.

**2. Composting of vegetable and fruit wastes**

Pit composting techniques were used for the preparation of compost. It consists of 8 pits which were constructed of the same dimension of 1.5 feet and 4 square feet area. In each pit, one kg of vegetable or fruit wastes and 20g of *Pleurotus eous and Trichoderma asperelloides* were uniformly sandwiched and it is named as C1 to C8. This process was repeated until the heap reaches a height of 1 meter. After $30^{th}$ day, the compost was transfer to the vermicomposting bed. Composting is carried out in two seasons, Summer (April-June) and Winter (Dec-Feb).

**Collection of earthworms**

The earthworm species African earthworm (*Eudrilus eugeniae*) was collected from ICAR KVK (Krishi Vigyan Kendra) Coimbatore, Tamil Nadu.

**Preparation of Vermicompost tray:**

About 60 x 30 x 15 cm plastic tray was brought from the market and small holes were made at the bottom of the trays to remove the excess water in the vermicompost tray. Vermibeds were prepared by combination of pre-decomposed Vegetable and Fruit wastes and cow dung in a 2:1 ratio (2 kg of pre-decomposed waste and 1 kg of dried cow dung on the trays named as C1, C2, C3, C4, C5, C6, C7 and C8 respectively.

### 3. Counting of Microbial flora of the vermicompost

In summer composting, the total bacterial count was increased significantly in C8 which is followed by C4- Vegetable wastes + cowdung + *Pleurotus eous* + *Trichoderma asperelloides* + *Eudrilus euginiae* (5 t/ha) when compared to control on $30^{th}$, $60^{th}$ and $90^{th}$ day with a remarkable increase on $60^{th}$ day. The fungal population in the vermicompost was found to significantly increase in C8- Fruit wastes + cowdung + *Pleurotus eous* + *Trichoderma asperelloides* + *Eudrilus eugeniae* (5 t/ha) treatment on the $30^{th}$ day which is followed by C4- Vegetable wastes + cowdung + *Pleurotus eous* + *Trichoderma asperelloides* + *Eudrilus euginiae* (5 t/ha) treatment and control. A remarkable increase was observed in C8 on $60^{th}$ day followed by other treatment and control. A slight decrease in the fungal population was noted in C8 and C4 on the $90^{th}$ day. The actinomycetes population was noted to increase in C8 and C4 treatment, when compared to control on the $30^{th}$ day with significant increase in its population, was observed on the $60^{th}$ day followed by a slight dip in the actinomycetes population on the $90^{th}$ day.

In winter composting, the bacterial, fungal and actinomycetes population was found to be significantly higher in C8 treatment and C4 treatment on the $30^{th}$ day while the remarkable microbial population was noted on the $60^{th}$ day with decreasing trend in population on the $90^{th}$ day when compared to control. The bacteria, fungi and actinomycetes count was conspicuously increased on the $30^{th}$ to $60^{th}$ day and from $60^{th}$ to $90^{th}$ day, it was reduced. The C8 and C4 compost have increased micronutrient contents, which might have enhanced the microbial population. The microbial population in summer composting might be higher due to the temperature of heat that helps in the decomposition of organic wastes.

### 4. Physico-chemical properties of raw and composted vegetable and fruit wastes

The Physico-chemical parameters lignin, cellulose, pH, Electrical Conductivity (millimhos cm-1), Total nitrogen (%), Total phosphorus (%), Total potassium (%) organic carbon, calcium, magnesium and C:N were analyzed in raw and composted vegetable and fruit waste to assess the compost maturity during summer and winter composting. A significant difference was noted in raw and biocomposted samples. Lignin are the starting material for humus formation that can contribute to soil health and productivity. Cellulose is the main source of energy for biological transformation, rise in temperature and chemical changes in the compost. In summer and winter composting, a significant decrease in lignin, cellulose, EC, organic carbon and C:N ratio was noted in C8- Fruit wastes + cowdung +

*Pleurotus eous* + *Trichoderma asperelloides* + *Eudrilus euginiae* (5 t/ha) treatment followed by C4- Vegetable wastes + cowdung + *Pleurotus eous* + *Trichoderma asperelloides* + *Eudrilus euginiae* (5 t/ha) treatment when compared to raw wastes sample. The increasing trend was noted in C8 and C4 treatment for pH, N, P, K, Ca and Mg. The changes in pH and EC value are due to the decomposition process and measuring the amount of nutrients in the compost in the form of salt.

**5. FT-IR analysis for raw and composted vegetable and fruit waste.**

The main objective of adapting Fourier Transform Infrared (FTIR) spectroscopic analysis in this study is to identify the presence of functional groups in raw and composted vegetable and fruit wastes sample of winter and summer vermicomposting. The raw vegetable and fruit wastes sample has a deep peak when compared to a composted sample having a smaller or disappearing peak may be due to the composting process. Functional group like O-H, C-H and C-O-C was found to be highest in summer vermicomposted sample over winter composted sample.

**PHASE II**

**1. Pot culture experiment**

In this experiment biocomposted vegetable and fruit wastes were incorporated in different treatments.

C – Control

$T_1$ (C1) - Vegetable wastes + cowdung + *Eudrilus euginiae* (5 t/ha)

$T_2$ (C2) - Vegetable wastes + cowdung + *Pleurotus eous* + *Eudrilus euginiae* (5 t/ha)

$T_3$ (C3) - Vegetable wastes + cowdung + *Trichoderma asperelloides* + *Eudrilus euginiae* (5 t/ha)

$T_4$ (C4) - Vegetable wastes + cowdung + *Pleurotus eous* + *Trichoderma asperelloides* + *Eudrilus euginiae* (5 t/ha)

$T_5$ (C5) - Fruit wastes + cowdung + *Eudrilus euginiae* (5 t/ha)

$T_6$ (C6) - Fruit wastes + cowdung + *Pleurotus eous* + *Eudrilus euginiae* (5 t/ha)

$T_7$ (C7) - Fruit wastes + cowdung + *Trichoderma asperelloides* + *Eudrilus euginiae* (5 t/ha)

$T_8$ (C8) - Fruit wastes + cowdung + *Pleurotus eous* + *Trichoderma asperelloides* + *Eudrilus euginiae* (5 t/ha)

**Collection of seeds:**

The seeds of a Black gram [*Vigna mungo* (L.) Hepper] Var. Co. 6 and Lablab [*Lablab purpureus* (L.) Sweet] Var. Co. (Gb) 14 were obtained from Tamil Nadu Agriculture University, Coimbatore, Tamil Nadu.

**2. Biometric characters**

The present study investigated the effect of composts by different treatments on vegetative parameters of Black gram and Lablab.

**Winter Composting:**

In Black gram, a significant increase in shoot length $T_8$ was observed which is followed by other treatments when compared to control on 15, 35 and 55 DAS. The highest root length was noted in $T_8$ treatment followed by $T_4$ and control on 15, 35 and 55 DAS. A maximum number of leaves per plant was noted in $T_8$ treatment over control. Fresh weight and dry weight of the plant were found to increase significantly in $T_8$ treatment followed by $T_4$ when compared to control from 15 to 55 DAS. The increase in the number of nodules was noted in $T_8$ treatment when compared to control on 25 and 50 DAS. A number of flowers/ plants was found to be maximum in $T_8$ treatment over control on 55 DAS.

In Lablab, the highest shoot length, root length and a maximum number of leaves were noted in $T_8$ treatment which is followed by $T_4$ treatment over control on 15, 35 and 55 Day After Sowing (DAS). The fresh weight of the plant was noted highest in $T_8$ treatment which is followed by $T_4$ treatment as compared to control. Similar results were also observed in dry weight, a significant increase in $T_8$ which is followed by other treatments and control on 15, 35 and 55 Day After Sowing (DAS). The number of nodules was found to be maximum in $T_8$ treatment followed by other treatments and control on 25 and 50 DAS and a maximum number of flowers/ plants was noted in $T_8$ treatment followed by $T_4$ treatment on 55 DAS.

**Summer composting:**

In Black gram, shoot length, root length and number of leaves increased significantly in $T_8$ treatment followed by $T_4$ and other treatments when compared to control on 15, 35 and 55 DAS. Fresh weight and dry weight of the plant significantly increase in $T_8$ treatment followed by $T_4$ as compared to control on 15, 35 and 55 DAS. The maximum number of nodules was observed in the $T_8$ treatment which is followed by other treatments and control on 25 and 50 DAS. The number of flowers/plants increased significantly in $T_8$ treatment followed by $T_4$ treatment when compared to control on 55 DAS.

In Lablab, maximum root length, shoot length and number of leaves were noted in $T_8$ treatment followed by $T_4$ when compared to the control on 15, 35 and 55 DAS. Fresh weight and dry weight increased significantly in $T_8$ treatment followed by $T_4$ treatment as compared to control on 15, 35 and 55 DAS. A significant increase in the number of nodules was noted in $T_8$ treatment followed by $T_4$ treatment when compared to control on 25 and 50 DAS. A

maximum number of flowers/plants was noted in the $T_8$ treatment when compared to the control on 55 DAS.

3. **Yield parameters**

**Winter Composting:**

In the selected test crop Black gram, a maximum number of pods/plant, pod length and number of seeds/pod was observed in $T_8$ treatment, followed by $T_4$ when compared to control. The fresh and dry weight content of the pods increase significantly in $T_8$ treatment which is followed by $T_4$ treatment when compared to control. The weight of the seed/ pod showed a maximum in $T_8$ followed by $T_4$ treatment as compared to the other treatments and control on 75 DAS. A similar result was shown in Lablab, a significant increase in the number of pods/plants, pod length and number of seeds/pods was noted in $T_8$ treatment which is followed by $T_4$ treatment when compared to control. The fresh and dry weight of the pod and weight of the seed increased significantly in $T_8$ treatment followed by other treatments and control on 75 DAS.

**Summer composting:**

In the test crop black gram, the yield parameters (number of pods/plants, pod length and number of seeds/pods) significantly increased in $T_8$ treatment followed by $T_4$ when compared to the control. The fresh, dry weight of the pod and weight of the seeds/ pod increased significantly in $T_8$ treatment when compared to control on 75 DAS. In Lablab, the yield parameters (number of pods /plant, number of seeds /pod, pod length, seed weight/ pod, pod fresh weight and dry weight) were found to be maximum in $T_8$ treatment which is followed by $T_4$ treatment when compared with other treatment and control on 75 DAS.

**PHASE III**

1. **Biochemical analysis**

**Winter Composting:**

In Black gram, biochemical parameters like protein, carbohydrates, chlorophyll 'a', chlorophyll 'b', and total chlorophyll contents in leaves were increased in $T_8$ treatment which is followed by $T_4$ treatment from 15 to 35 DAS and a decline in its content was noted on 55 DAS. Protein, carbohydrate and crude protein in the seed of the test crop were maximum in $T_8$ treatment followed by other treatments and control on 75 DAS. Leghaemoglobin content in root nodules on 25 and 50 DAS was maximum in $T_8$ which is followed by $T_4$ treatment when compared to the control. A significant increase in protein, carbohydrate, chlorophyll 'a', chlorophyll 'b' and 'total' chlorophyll content in leaves was observed in $T_8$ treatment

followed by other treatments when compared to control in Lablab on 15, 35 DAS and a slight decrease on 55 DAS. Protein, carbohydrates and crude protein in seeds were found to be maximum in $T_8$ treatment when compared to control on 75 DAS. Leghaemoglobin content in root nodules increased significantly in $T_8$ treatment which is followed by other treatments and control on 25 and 50 DAS.

**Summer Composting:**

From 15 to 35 DAS, an increase in protein, carbohydrate, chlorophyll 'a', chlorophyll 'b' and 'total' chlorophyll content was noted in $T_8$ which is followed by $T_4$ as compared to the control with a moderate decrease in the content on 55 DAS in leaves of a Black gram. A maximum increase in protein, carbohydrates and crude protein in seeds was observed in $T_8$ treatment followed by $T_4$ treatment as compared to control. Leghaemoglobin content in root nodules (25 and 50 DAS) was maximum in $T_8$ followed by $T_4$ treatment over control. In Lablab, protein, carbohydrate, chlorophyll 'a', chlorophyll 'b' and total chlorophyll content in leaves was increased significantly in $T_8$ treatment followed by other treatments and control from 15 to 35 DAS and slightly lower on 55 DAS. Protein, carbohydrates and crude protein in seeds were maximum in $T_8$ treatment which is followed by $T_4$ when compared to control on 75 DAS. The highest leghaemoglobin content in root nodules (25 and 50 DAS) was noted in $T_8$ followed by $T_4$ treatment as compared to control.

Application of biocompost increases the protein content upto 35 DAS maybe due to increases in percentage of nitrogen and phosphorous in the plant while decrease on 55 DAS due to the utilization for flower or fruit formation. The increase in carbohydrate may be due to the addition of organic substrates in the soil. The chlorophyll content increases from 15 to 35 DAS due to the uptake of NPK which is readily available in the biocompost which are used for the formation of chlorophyll and declined in its content due to breakdown of the protein and ageing of leaves.

**2. Soil Analysis**

**Pre-harvest Soil Analysis:**

The study revealed that initial soil pH, electrical conductivity, available nitrogen, available phosphorus, and available potassium were analyzed and noted more in $T_8$- Fruit wastes + cowdung + *Pleurotus eous* + *Trichoderma asperelloides* + *Eudrilus euginiae* (5 t/ha) followed by $T_4$- Vegetable wastes + cowdung + *Pleurotus eous* + *Trichoderma asperelloides* + *Eudrilus euginiae* (5 t/ha) when compared to control.

**Post-harvest soil analysis:**

In winter and summer vermicomposting, pH, electrical conductivity, available nitrogen (kg/ha), phosphorus (kg/ha) and potassium (kg/ha) were recorded maximum in $T_8$- Fruit wastes + cowdung + *Pleurotus eous* + *Trichoderma asperelloides* + *Eudrilus euginiae* (5 t/ha) followed by $T_4$- Vegetable wastes + cowdung + *Pleurotus eous* + *Trichoderma asperelloides* + *Eudrilus euginiae* (5 t/ha) and control in black gram and lablab.

**PHASE IV**

Among the eight types of biocompost $T_8$ treatment was noted to be efficient compost when compared to other treatments and control. The $T_8$ treatment enhanced the microbial population, Physico-chemical, biometrics, biochemical and yield parameters, initial and post-harvest soil analysis of black gram and lablab. To support the above experimental results, antioxidant and antimicrobial activity was carried out in aqueous and methanol seed extract under the best treatment ($T_8$) and control for the test crops grown in winter and summer composting.

**Antioxidant activity:**

The seed of black gram and lablab plant samples was analyzed for free radical scavenging assay such as DPPH radical scavenging activity, nitric oxide radical scavenging activity and reducing power assay in aqueous and methanol extract. Comparing the aqueous and methanolic extracts of the two plants grown in winter and summer vermicomposting, remarkable antioxidant activity was noted in methanol extract of black gram which is followed by lablab grown in biocompost carried out during summer season in the best treatment ($T_8$) when compared to control respectively.

**Antibacterial activity:**

Antibacterial activity of black gram and lablab seed (best treatment ($T_8$) and control) were examined in aqueous and methanol extract against gram-positive (*Staphylococcus aureus*) and gram-negative (*Escherichia coli*) bacterial species. Methanolic extract of lablab plant of summer composting showed the highest zone of inhibition against *Escherichia coli* in best treatment followed by winter composting methanolic lablab extract and aqueous extract.

**PAPER PUBLICATION**

1. **Raihing, P.** and Vijayalakshmi, A (2021). Effect of Vermicomposted Vegetable and Fruit Wastes on the Vegetative and Yield Parameters of Lablab [*Lablab Purpureus* (L.) Sweet]. Agricultural Science Digest, (Page: 1-5), DOI: 10.18805/ag.D-5476

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6. S. Hema, A. Vijayalakshmi, **Pinky Raihing,** (2022). The Effect of Paddy and Coffee Husk as the Organic Manure on the Vegetative and Yield Parameters of Moth Bean [*Vigna aconitifolia* (Jacq) Marechal], DOI: 10.18805/ag.D-5578

## CONCLUSION

The present research is to bring out the possibilities of using municipal solid waste such as vegetable and fruit waste for biocomposting by degradation of fungi (*Pleurotus eous* (APK1) and *Trichoderma asperelloides*) and earthworm species *Eudrilus eugeniae* as an efficient organic manure for the plant growth. The compost of vegetable and fruit wastes can be used as manure which is eco-friendly and sustainable to the environment. The manure produced from the wastes is cost-effective and eco-friendly. From the results, it can be concluded that combined application of compost increased the biometric, biochemical, yield parameter, antioxidant and antibacterial activity in the test crops namely black gram and lablab over control on both winter and summer composting. Vegetable and fruit waste biocompost give an alternative source of organic manure over chemical fertilizers which improves water holding capacity and soil fertility. Chemical fertilizers may increase the yield of the crops for a short duration but they will affect soil fertility, soil degradation and deteriorate the environment. The study also provides an alternative way for the disposal of vegetable and fruit waste and reduces the use of chemical fertilizers on crops by the farmers and enhances crop productivity.

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